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Montana State Office

August 1997

Montana/Dakotas Standards for Rangeland Health and Guidelines for Livestock Grazing Management

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STANDARDS FOR RANGELAND HEALTH
AND
GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

BUTTE DISTRICT

Preamble

The Butte Resource Advisory Council (BRAC) has developed standards for rangeland health and guidelines for livestock grazing management for use on the Butte District of the Bureau of Land Management (BLM). The purpose of the S&Gs are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use.

BRAC determined that the following considerations were very important in the adoption of these S&Gs:

1. For implementation, the BLM should emphasize a watershed approach that incorporates both upland and riparian standards and guidelines.

2. The standards are applicable to rangeland health, regardless of use.

3. The social and cultural heritage of the region and the viability of the local economy, are part of the ecosystem.

4. Wildlife is integral to the proper function of rangeland ecosystems.

Standards

Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant progress towards these functions and conditions is required of all uses of public rangelands as stated in 43 CFR 4180.1. Baseline, monitoring and trend data, when available, should be utilized to assess compliance with standards.

Butte STANDARD #1:

Uplands are in proper functioning condition.

• As addressed by the preamble to these standards and as indicated by:

- erosional flow patterns;
- surface litter;
- soil movement by water and wind;
- soil crusting and surface sealing;
- compaction layer;
- rills;
- gullies;
- cover amount; and
- cover distribution.

Biotic Environment

- community diversity;
- community structure;
- exotic plants;
- photosynthesis activity;
- plant status;
- seed production;
- recruitment; and
- nutrient cycle.

The determination of rangeland health should be based on the evaluation of three criteria: degree of soil stability and watershed function, nutrient cycles and energy flows, and available recovery mechanisms.

Indicators to assess soil stability and watershed function relate to two fundamental processes of watershed degradation: (1) Soil erosion by wind and water; and (2) infiltration or capture and utilization of precipitation. Indicators such as rills, gullies, flow patterns, pedestaling and compaction, may be used to assess watershed condition.

Indicators that can be used to evaluate nutrient cycles and energy flows relate to distribution of plants, litter, roots, and photosynthetic period; i.e., plant community diversity and structure, exotic plants, photosynthetic activity and plant status.

Recovery mechanisms or plant demographic indicators may include increasing vegetative cover, plant vigor, kind and number of seedlings, and changes in plant age distribution.

• Physical environmental features of a proper functioning watershed are indicated by:

- little evidence of soil erosion by wind and/or water;

- rills, gullies, pedestaling, flow patters are not present (significant);
- surface sealing and soil crusting is not evident;
- plant (ground) cover and litter accumulation is adequate to protect site; and
- natural disturbance events are integral to proper ecosystem function.

• Biotic environment features of a proper functioning watershed are indicated by:

- variety and number of plant life-forms (grass, forb, shrub, tree, succulent) across the site;
- plants exhibit a good diversity of size, height, distribution, and age/class well distributed;
- exotic plants, weeds are absent or sparse on site;
- plants display normal growth and root development;
- photosynthesis activity occurs throughout the site;
- plants are alive, productive with well developed root systems;
- seed stalks/seed adequate for stand maintenance for all life-forms;
- litter distribution and incorporation is uniform across site; and
- nutrient/energy cycle mechanisms are adequate for plant maintenance.

Butte STANDARD #2:

Riparian and wetland areas are in proper functioning condition.

• As addressed by the preamble to these standards and as indicated by:

Hydrologic

- flood plain inundated in relatively frequent events (1-3 years);
- amount of altered streambanks;
- sinuosity, width/depth ratio, and gradient are inbalance with the landscape setting (i.e., landform, geology, and bioclimatic region);
- riparian zone widening; and
- upland watershed not contributing to riparian degradation.

Erosion Deposition

- flood plain and channel characteristics; i.e., rocks, coarse and/or woody debris adequate to dissipate energy;
- point bars are vegetating;
- lateral stream movement is associated with natural sinuosity;
- system is vertically stable;
- stream is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition); and
- bare ground.

Vegetation

- reproduction and diverse age structure of vegetation;
- diverse composition of vegetation;
- species present indicate maintenance of riparian soil moisture characteristics;
- streambank vegetation is comprised of those plants or plant communities that have deep binding root masses capable of withstanding high streamflow events;
- utilization of trees and shrubs;
- riparian plants exhibit high vigor;
- adequate vegetative cover present to protect banks and dissipate; energy during high flows; and
- plant communities in the riparian area are an adequate source of large woody debris.

Broadly, "proper functioning condition" may be defined as the ability of a stream to perform its riparian functions. These functions include sediment filtering, bank building, water storage, aquifer recharge, and hydrologic energy dissipation.

No single factor or characteristic of a riparian site can provide a complete picture of either that site's condition or the direction of its successional change. Things considered "negative" in traditional evaluations of ecological sites may not be such for riparian sites. For example, the percent of exposed soil surface, which often reflects overgrazing or erosion on upland sites, may be a result of normal riparian activity; sediment deposition resulting after spring runoff, or a high water event.

Hydrology\Streambanks

The hydrology of a riparian area is perhaps its most important characteristic. Changes in hydrology may result in short and long-term vegetative changes. In some situations, construction (rip rap, roads, railroads, etc.) has influenced the streambanks and stability has been increased over the natural levels. These streambanks may eventually lose their stability, and become altered. This generally occurs if the problems which caused the weak streambanks have not been remedied. Also, constructed streambanks (especially those with rip rap) will often disrupt the normal energy dissipation of the stream and eventually the meandering of a stream can result in the erosion of streambanks downstream.

Lateral Cutting

Lateral cutting is indicated by new stream-caused bank disruption along the outside of stream curves, and much less commonly along the straight portions of a stream. A high degree of active lateral cutting can indicate a degraded watershed.

Altered Streambanks

In many instances, land uses have degraded streambanks, accelerating stream movement across the flood plain. We define altered streambanks as those having impaired structural integrity (strength or stability) due to human-caused activities such as exposed soil surfaces from cattle trails and wallows, hiking and ATV trails, roads, logging skid trails, mining activities, etc.

Deep Binding Root Mass

Properly functioning streambanks are "armored by both vegetation and bank rock materials (e.g., boulders and cobbles). There have been few studies documenting the depth and extent of root systems of various plant species. Despite this lack of documented evidence, some generalizations can be made. All tree and shrub species are considered to have deep, binding root masses. Among riparian herbaceous species, the first rule is that annual plants do not have deep, binding root masses. Perennial species offer a wide range of root mass qualities. Some rhizomatous species, such as the deep-rooted sedges, are excellent streambank stabilizers. Other rhizomatous species such as Kentucky bluegrass, have only shallow root systems and are poor streambank stabilizers. Still others such as Baltic rush, appear to be intermediate in their ability to stabilize banks.

Downcutting

Active downcutting of a stream is often hard to recognize. Perched wetland vegetation and streambank features, plus the lack of a separate layer of channel bottom materials (i.e., the stream flows directly on the substrate materials), can be clues to downcutting. A stream is incised when downcutting of the stream has resulted in a width to depth ratio so low that average 2-year floods do not come out of the banks.

Soils/Geology

The soils and geology (landform and parent material) of a riparian site influence how the site reacts to disturbances and changes over time. Changes in physical characteristics are often (but not always) more difficult to remedy through management actions than are vegetative changes. The depth and texture of soil, of a riparian site, influences the capacity of that site to hold water (act as a sponge) for prolonged late season flows and support desired vegetation.

Bare Ground

Exposed soil surface is important in evaluating the health of riparian areas for several reasons: (1) vulnerability to erosion; (2) it may contribute to, as well as reflect, streambank deterioration; (3) the more exposed soil, the less vegetation is available for soil protection and sediment entrapment; and (4) exposed soil provides opportunity for invasion by noxious weeds and undesirable species.

Vegetation

Because they are more visible than soil or hydrological characteristics, plants may provide early indications of riparian health.

Reproduction of Trees and Shrubs

One of the clearest indicators of ecological stability, and subsequent health, is the presence of all age classes (seedling, sapling, pole, mature, decadent, and dead) of tree and shrub species where the potential exists.

Dead and Decadent Trees and Shrubs

The amount of dead and decadent material in trees and shrubs is another indicator of the overall "health" of riparian areas. Large amounts of decadent and dead woody material can indicate severe stress due to high levels of browsing, and/or dewatering of the site from artificial or natural causes. If severe enough, this may change the potential from a riparian to an upland site. Large amounts of decadent and dead woody material may indicate fluctuations in climate, such as severe winter temperatures, spring freezes, or insect infestations. In all cases, the overall biotic health is effected and may have implications on physical features of a stream such as streambank integrity, channel incisement, and lateral cutting.

Utilization of Trees and Shrubs

Heavy utilization by livestock and/or wildlife can prevent the regeneration or establishment of woody species and, thus block succession of the plant community toward a later seral stage. As with herbaceous species, excessive use of these woody species may cause their elimination from the site and their replacement by disturbance-induced species or undesirable invaders.

Plant Composition

The presence of disturbance-induced herbaceous plants (either native or introduced) may indicate that the site could

be more healthy and thus is not performing its optimum riparian functions. Most of these species provide less soil holding and sediment trapping capability, and less desirable forage for livestock and wildlife.

Butte STANDARD #3:

Water quality meets State standards.

• As addressed by the preamble to these standards and as indicated by:

- dissolved oxygen concentration;
- pH;
- turbidity;
- temperature;
- fecal coliform;
- sediment;
- color;
- toxins; and
- other parameters: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

When discussing rangeland health, water quality is a relative term which must be associated with water-use to become meaningful. Since the beginning of time, natural processes have influenced the chemical, physical, and biological characteristics of water. The natural quality of water varies from place to place, with the season of the year, with the climate, and with the kind of rock and soil through which water moves. After reaching the earth, water dissolves minerals from the earth's crust, percolates through organic materials such as roots and leaves, and reacts with living things such as microscopic organisms like plankton and algae. Natural water quality is changed by stream sediments; it is modified by temperature, soil bacteria, and evaporation. These and other factors determine the quality of natures "impure" water.

Water quality criteria specify concentrations of water constituents which, if not exceeded, are expected to support an aquatic ecosystem suitable for higher uses of water. Water quality criteria are intended to protect essential and significant life in water, as well as the direct users of water, and also to protect life that is dependent on life in water for its existence.

• Some of the common indicators of water quality are:

- Dissolved oxygen concentration (DO)-is a function of temperature of the water, altitude and barometric pressure. The ability of water to hold oxygen decreases with the increases in temperature, altitude and dissolved solids. This is important in fish spawning areas where DO levels must be maintained at specific levels for good growth and general well being of fish and associated biota.

-pH (hydrogen-ion concentration)-is an indicator of acidity and/or alkalinity and an index of hydrogen-ion activity. Lower values indicated acid, higher values indicated alkaline. Fresh water organisms function properly if the pH ranges from 6.0 to 9.0 units. pH concentrations below the recommended level are toxic to fish and other aquatic organisms.

- Turbidity-is the disturbance of water due to the presence of suspended matter such as clays, silt, organic matter, and various effluents. It is the expression of the optical property of water. Excess turbidity reduces light penetration, which reduces photosynthesis by phytoplankton, and submerged vegetation.

- Temperature-is an important function which affects aquatic productivity. Temperature changes may result from natural climatic conditions due to man's manipulation of the riparian environment. Temperature is a function of location, season, time, duration of flow, depth, and many other variables. Aquatic biota are adapted to certain thermal conditions existing in the habitat for their survival and well being. The interrelationship between these conditions is so great that small changes in temperature may have far-reaching effects.

- Coliform groups-include bacteria organisms in their natural habitat and sources; i.e., feces, soil, water, vegetation, etc. Fecal coliform may be an indicator of recent fecal pollution. Other coliform organisms may be the result of plant and soil runoff water.

- Sediment-is a measure of suspended sand, silt, colloid and organic matter which will settle in time to the stream bottom. They originate from sources such as erosion, mine waste, plowed fields, construction projects, natural erosion, or vegetative manipulation. They may affect fisheries by covering the bottom of the stream or lake with a blanket of material that destroys the bottom fauna or spawning grounds for fish.

- Color-is attributed to substances in solution after the suspensoid have been removed. It may be organic or inorganic substances that affect photosynthesis activity in the water. Organic substances include humic materials, peat, aquatic plants, etc. Inorganic sources include iron and manganese compounds, chemicals, industrial waste, etc.

- Toxins-are those compounds or substances which are found in by-products or waste of the various industries

or activities that make their way into water sources which produce a variety of effects on fish or alter the biological productivity of water sources.

• Acceptable water quality is indicated by:

- Dissolved oxygen concentrations-DO concentrations are being maintained at or near saturation levels.
- pH-concentrations are at or near recommended State levels.
- Turbidity-readings do not exceed Jackson Turbidity Unit readings for the water source.
- Temperature-water temperature readings meet State standard preferred for good growth and productivity.
- Coliform-organisms of the coliform group do not exceed State average for the site.
- Sediment-water normally contains suspended solids that do not exceed State standard.
- Color-water color does not limit or significantly restrict photosynthesis processes.
- Toxins-levels are in conformance with State standard.

Butte STANDARD #4:

Air quality meets State standards.

• As addressed by the preamble to these standards and as indicated by:

Section 176(c) of the Clean Air Act, which states that activities of all Federal agencies must conform to the intent of the appropriate State Air Quality Implementation Plan and not:

- cause or contribute to any violations of ambient air quality standards;
- increase the frequency of any existing violations; and
- impede the State's progress in meeting its air quality goals.

Montana Air Quality Standards

PM-10	50 ug/m3 annual ave. 150 ug/m3 24-hr avg.*
Sulfur Dioxide	0.02 ppm annual ave. 0.10 ppm 24-hr avg.* 0.50 ppm 1-hr avg.**
Carbon Monoxide	23 ppm hourly avg.* 9.0 ppm 8-hr avg.*
Nitrogen Dioxide	0.05 ppm annual avg. 0.30 ppm hourly avg.*
Ozone	0.10 ppm hourly avg.*
Lead	1.5 ug/m3 90 day avg.
Foliar Fluoride	35 ug/g grazing season avg. 50 ug/g monthly avg.
Settled Particulate	10mg/m2 30-day avg. Matter (dustfall)
Hydrogen Sulfide	0.05 ppm hourly avg.*
Visibility	particle scattering coefficient of 3x10-5 per meter annual average.***

* Not to be exceeded more than once per year.
** Not to be exceeded more than 18 times per year.
*** Applies to PSD mandatory Class I areas.

The Clean Air Act established the Prevention of Significant Deterioration (PSD) regulations which set limits for increases in ambient pollution levels and established a system for preconstruction review of new major air pollution sources. Three PSD classes have been established: Class I, Class II, and Class III. Class I areas consist of all international parks, national parks greater than 5,000 acres, national wilderness areas greater than 5,000 acres, and national wildlife refuges which existed on August 7, 1977, when the amendment was signed into law.

Protection of air quality is provided to Class I areas by severely limiting the amount of additional human-caused air pollution which can be added. All other areas, except non-attainment areas, are classified as Class II in which a greater amount of additional human-caused pollution may be added. In no case, however, may pollutant concentrations exceed the National or State ambient air quality standards.

Butte STANDARD #5:

Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species.

• As addressed by these standards and as indicated by:

- plants and animals are diverse, vigorous and reproducing satisfactorily, noxious weeds are absent or insignificant in the overall plant community;

- spatial distribution of species is suitable to ensure reproductive capability and recovery;
- a variety of age classes are present;
- connectivity of habitat or presence of corridors prevents habitat fragmentation;
- diversity of species (including plants, animals, insects and microbes) are represented; and
- plant communities in a variety of successional stages are represented across the landscape.

BLM is charged with managing and developing habitat for a large variety of fish, wildlife, and special status species of plants. Basic habitat considerations can be categorized as including food, water, cover, and space. Specific habitat requirements often vary depending on what geographic area is being considered, species which are present, and the nature and extent of other uses which may be competing. A review of components of the above listed standards (Proper Functioning Riparian-Wetland areas, Uplands and Water Quality) will provide much of the requirements needed to achieve fish, wildlife, and special status plant habitat.

Guidelines

Butte GUIDELINE #1:

Manage grazing to maintain or improve watershed vegetation, biodiversity, and flood plain function. Maintain or improve riparian vegetative cover and structure to trap and hold sediments during run-off events to rebuild streambanks, restore/recharge aquifers, and dissipate flood energy. Promote deep-rooted herbaceous vegetation to enhance streambank stability. Where potential for woody shrub species (willows, dogwood, etc.) exists, promote their growth or expansion to aid in controlling access to streambanks, and to provide wildlife cover.

Butte GUIDELINE #2:

Pastures and allotments will be periodically inventoried to determine their relative suitability for livestock grazing. Topography, slope, distance from water, or vegetation habitat types, wildlife, channel types, soil types, and other resource values must be considered when determining grazing potential. Specific areas could be excluded from grazing, fenced into separate management pastures, or managed more intensively.

Butte GUIDELINE #3:

Management strategies for livestock grazing should produce sustainable hydrological, vegetative, and soil conditions. Thresholds for acceptable streambank alteration and vegetation utilization can be site-specific, and they should be the basis for establishing terms and conditions for allotments. These thresholds should be consistent with standards and result from application of scientifically acceptable hydrological and biological principles. Each allotment must have a monitoring plan, and monitoring results should be critical input to grazing system design. Long-term analysis of trend shall be the primary monitoring tool, and will be augmented by short term monitoring information. Monitoring plans should address rangeland standards including hydrologic, vegetative, and soil conditions.

Long-term and short-term monitoring attributes may include:

Hydrologic

- stream morphology; and
- streambank alteration.

Vegetative

- species composition;
- plant density;
- demographics;
- stubble height; and
- utilization.

Soils

- percent bare ground;
- compaction; and
- pedestaling.

Self-monitoring by permittee should be encouraged, but with these sideboards:

- permittee's data and BLM's data should be comparable;
- BLM must perform some level of compliance monitoring for each self monitored allotment to ensure the permittee's monitoring is being done and it is valid;
- there should be regular reporting of self-monitoring data; and
- when appropriate, monitoring should include the use of reference sites (such as exclosures).

Permittees and interested members of the public should be able to participate in the development of monitoring plans.

Butte GUIDELINE #4:

Compatible seasons and duration of use, rest periods, stocking rates, structural facilities, and management activities, should be designed and implemented to ensure that standards are achieved.

Butte GUIDELINE #5:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions, processes and native species of those sites.

Butte GUIDELINE #6:

Locate facilities (e.g., corrals, water developments) away from riparian areas and wetlands when possible.

Butte GUIDELINE #7:

Supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas. Placement of salt in upland sites should consider critical winter wildlife habitat.

Butte GUIDELINE #8:

Noxious weed control is essential and should include: cooperative agreements, public education, and integrated pest management (mechanical, biological, chemical). Butte RAC has addressed weeds in a Resolution dated May 8, 1996 (attached).

Butte GUIDELINE #9:

Native species are preferred. Non-native species, where contributing to proper ecosystem function, are acceptable.

Butte GUIDELINE #10:

Livestock management should utilize Best Management Practices for livestock grazing that meet or exceed those approved by the State of Montana in order to maintain, restore or enhance water quality.

Butte GUIDELINE #11:

Grazing management practices should maintain or improve habitat for federally listed threatened, endangered, and sensitive plants and animals.

STANDARDS FOR RANGELAND HEALTH
AND
GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

LEWISTOWN DISTRICT

Standards

Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant and measurable progress towards these functions and conditions is required of all uses of public rangelands. Historical data, when available, should be used when assessing progress towards these standards.

Lewistown STANDARD #1:

Uplands are in proper functioning condition.

This means that soils are stable and provide for capture, storage and safe release of water appropriate to soil type, climate and landform. The amount and distribution of ground cover (i.e., litter, live and standing dead vegetation, microbiotic crusts, and rock/gravel) for identified ecological site(s) or soil-plant associations are appropriate for soil stability.

Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/surface scaling and compaction layers below the soil surface is minimal. Ecological processes including hydrologic cycle, nutrient cycle and energy flow are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential and there is a diversity of species characteristic of and appropriate to the site. Assessing proper functioning conditions will consider use of historical data.

• As indicated by

Physical Environment

- erosional flow patterns;
- surface litter;
- soil movement by water and wind;
- soil crusting and surface sealing;
- compaction layer;
- rills;
- gullies;
- cover amount; and
- cover distribution.

Biotic Environment

- community richness;
- community structure;
- exotic plants;
- plant status;
- seed production;
- recruitment; and
- nutrient cycle.

Lewistown STANDARD #2:

Riparian and wetland areas are in proper functioning condition.

This means that the functioning condition of riparian-wetland areas is a result of the interaction among geology, soil, water and vegetation. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid flood plain development; improve flood water retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for native fish production, waterfowl breeding, and other uses appropriate for the area that will support greater species richness.

The riparian-wetland vegetation is a mosaic of species richness and community structure serving to control erosion, shade water, provide thermal protection, filter sediment, aid flood plain development, dissipate energy, delay flood water, and increase recharge of groundwater where appropriate to landform. The stream channels and flood plain dissipate energy of high waterflows and transport sediment appropriate for the geomorphology (e.g., gradient, size, shape, roughness, confinement, and sinuosity), climate, and landform. Soils support appropriate riparian-wetland vegetation, allowing water movement, filtering sediment, and slowing ground water movement for later release. Stream channels are not entrenching beyond natural climatic variations and water levels maintain appropriate riparian-wetland species.

Riparian areas are defined as land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil. Assessing proper functioning conditions will consider use of historical data.

• As indicated by:

Hydrologic

- flood plain inundated in relatively frequent events (1-3 years);
- amount of altered streambanks;
- sinuosity, width/depth ratio, and gradient are in-balance with the landscape setting (i.e., landform, geology, and bioclimatic region); and
- upland watershed not contributing to riparian degradation.

Erosion Deposition

- plain and channel characteristics; i.e., rocks, coarse and/or woody debris adequate to dissipate energy;
- point bars are being created and older point bars are being vegetated;
- lateral stream movement is associated with natural sinuosity;
- system is vertically stable; and
- stream is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).

Vegetation

- reproduction and diverse age class of vegetation;
- diverse composition of vegetation;
- species present indicate maintenance of riparian soil moisture characteristics;
- streambank vegetation is comprised of those plants or plant communities that have deep binding root masses capable of withstanding high streamflow events;
- utilization of trees and shrubs;
- riparian plants exhibit high vigor;
- adequate vegetative cover present to protect banks and dissipate energy during high flows; and
- where appropriate, plant communities in the riparian area are an adequate source of woody debris.

Lewistown STANDARD #3:

Water quality meets Montana State standards.

This means that surface and groundwater on public lands fully support designated beneficial uses described in the Montana Water Quality Standards. Assessing proper functioning conditions will consider use of historical data.

• As indicated by

- dissolved oxygen concentration;
- pH;
- turbidity;
- temperature;
- fecal coliform;
- sediment;
- color;
- toxins; and
- others: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

Lewistown STANDARD #4:

Air quality meets Montana State standards.

This means that air quality on public lands helps meet the goals set out in the State of Montana Air Quality Implementation Plan. Efforts will be made to limit unnecessary emissions from existing and new point or nonpoint sources.

The BLM management actions or use authorizations do not contribute to air pollution that violates the quantitative or narrative Montana Air Quality Standards or contributes to deterioration of air quality in selected class area.

• As indicated by:

- Section 176(c) Clean Air Act which states that activities of all federal agencies must conform to the intent of the appropriate State Air Quality Implementation Plan and not:

  - cause or contribute to any violations of ambient air quality standards;
  - increase the frequency of any existing violations; and
  - impede the State's progress in meeting their air quality goals.

Lewistown STANDARD #5:

Habitats are provided to maintain healthy, productive and diverse populations of native plant and animal species, including special status species (federally threatened, endangered, candidate or Montana species of special concern as defined in BLM Manual 6840, Special Status Species Management).

This means that native plant and animal communities will be maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant lifeforms. Where native communities exist, the conversion to exotic communities after disturbance will be minimized. Management for indigenous vegetation and animals is a priority. Ecological processes including hydrologic cycle, and energy flow, and plant succession are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential, and there is a diversity of plant and animal species characteristic of and appropriate to the site. The environment contains components necessary to support viable populations of a sensitive/threatened and endangered species in a given area relative to site potential. Viable populations are wildlife or plant populations that contain an adequate number of reproductive individuals distributed on the landscape to ensure the long-term existence of the species. Assessing proper functioning conditions will consider use of historical data.

• As indicated by:

- plants and animals are diverse, vigorous and reproducing satisfactorily noxious weeds are absent or insignificant in the overall plant community;
- spatial distribution of species is suitable to ensure reproductive capability and recovery;
- a variety of age classes are present;
- connectivity of habitat or presence of corridors prevents habitat fragmentation;
- species richness (including plants, animals, insects and microbes) are represented; and
- plant communities in a variety of successional stages are represented across the landscape.

Grazing Management Guidelines

Guidelines for management of herbivory (including domestic animals and wildlife) are preferred or advisable approaches to ensure that standards can be met or that significant progress can be made toward meeting the standard(s). Responsible state and Federal wildlife agencies must be involved in this management if standards are to be achieved.

Guidelines are provided to maintain or improve resource conditions in upland and riparian habitats. In both riparian and upland habitats, these guidelines focus on establishing and maintaining proper functioning conditions. The application of these guidelines is dependent on individual management objectives. Desired future conditions in plant communities and streambank characteristics will be determined on a case-by-case basis.

Lewistown GUIDELINE #1:

Grazing will be managed in a manner that will maintain the proper balance between soils, water, and vegetation over time. This balance varies with location and management objectives, historic use, and natural fluctuations, but acceptable levels of use can be developed that are compatible with resource objectives.

Lewistown GUIDELINE #2:

Manage grazing to maintain watershed vegetation, species richness, and flood plain function. Maintain riparian vegetative cover and structure to trap and hold sediments during run-off events to build streambanks, recharge aquifers, and dissipate flood energy. Grazing management should promote deep-rooted herbaceous vegetation to enhance streambank stability. Where non-native species are contributing to proper functioning conditions, they are acceptable. Where potential for palatable woody shrub species (willows, dogwood, etc.) exists, promote their growth and expansion within riparian zones.

Lewistown GUIDELINE #3:

Pastures and allotments will be managed based on their sensitivity and suitability for livestock grazing. Where determinations have not been previously documented, suitability for grazing will be determined by: topography, slope, distance from water, vegetation habitat types, and soil types must be considered when determining grazing suitability. Unsuitable areas should be excluded from grazing.

Lewistown GUIDELINE #4:

Management strategies for livestock grazing will ensure that long-term resource capabilities can be sustained. End of season stubble heights, streambank moisture content, and utilization of herbaceous and woody vegetation are critical factors which must be evaluated in any grazing strategy. These considerations are essential to achieving long-term vegetation or stream channel objectives and should be identified on a site-specific basis and used as terms and conditions.

Lewistown GUIDELINE #5:

Grazing will be managed to promote desired plants and plant communities of various age classes, based on the rate

and physiological conditions of plant growth. Management approaches will be identified on a site-specific basis and implemented through terms and conditions. Caution should be used to avoid early spring grazing use when soils and streambanks are wet and susceptible to compaction and physical damage that occurs with animal trampling. Likewise, late summer and fall treatments in woody shrub communities should be monitored closely to avoid excessive utilization.

Lewistown GUIDELINE #6:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

Lewistown GUIDELINE #7:

Locate facilities (e.g., corrals, water developments) away from riparian-wetland areas.

Lewistown GUIDELINE #8:

When provided, supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas (i.e., key wildlife wintering areas). Salt and minerals should be placed in upland sites to draw livestock away from watering areas or other sensitive areas and to contribute to more uniform grazing distribution.

Lewistown GUIDELINE #9:

Noxious weed control is essential and should include: cooperative agreements, public education, and integrated pest management (mechanical, biological, chemical).

Lewistown GUIDELINE #10:

Livestock management should utilize practices such as those referenced by the NRCS published prescribed grazing technical guide to maintain, restore or enhance water quality.

Lewistown GUIDELINE #11:

Grazing management should maintain or improve habitat for federally listed threatened, endangered, and sensitive plant and animals.

Lewistown GUIDELINE #12:

Grazing management should maintain or promote the physical and biological conditions to sustain native populations and communities.

Lewistown GUIDELINE #13:

Grazing management should give priority to native species. Non-native plant species should only be used in those situations where native seed is not readily available in sufficient quantities, where native plant species cannot maintain or achieve the standards, or where non-native plant species provide an alternative for the management and protection of native rangelands.

Lewistown GUIDELINE #14:

Allotment monitoring determines how on-going management practices are affecting the rangeland. To do so, the evaluations should be based on: measurable management objectives; permanent and/or repeatable monitoring locations; and short-term and long-term data.

STANDARDS FOR RANGELAND HEALTH
AND
GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

MILES CITY DISTRICT

Preamble

Rangeland health can be defined as the degree to which the integrity of the physical and ecological processes of the rangeland ecosystems are sustained.

The capacity of rangelands to produce commodities and satisfy values on a sustained basis depends upon the internal, self-sustaining ecological processes such as soil development, nutrient cycling, energy flow, and the structure and dynamics of plant and animal communities.

Rangeland health is the minimum ecological standard, independent of the rangeland's use and how it is managed. If rangeland health is protected, a variety of uses could be appropriate for any particular rangeland.

Standards apply to rangeland health and not to the important by-products of healthy rangelands such as more fish, higher livestock weaning weights, regional social and cultural values, increased timber production, economic viability of livestock operations or higher numbers of game animals. It is sustainability of the processes, of rangeland health, that produces these social values and commodities.

The Bureau of Land Management is committed to grazing as an appropriate use of public rangelands and to maintaining healthy and productive rangelands that support stable western communities. This is a commitment that began with the Taylor Grazing Act, which reversed the decline in the health of the range, is reiterated in the Federal Land Policy Management Act that ensures public lands are managed for multiple use and guarantees grazing as an activity on the public lands.

Standards for Rangeland Health and Guidelines for Livestock Grazing Management are intended to maintain healthy and productive public rangelands that are essential to support long-term grazing and stable communities that rely on the land.

Standards apply to the health of the land. All uses of public rangeland need to be conducted in such a manner that standards are achieved. Standards are measurable levels of resource quality, condition, or function upon which management decisions are based. It is BLM's policy to achieve rangeland health standards through management of existing uses when feasible.

Standards provide the technical and scientific basis for measuring progress towards healthy productive rangelands.

Disturbance regimes such as fire, climatic events, geology, the natural and historic range of variability and the potential of the area are considered when assessing rangeland health.

Standards are not expected to recreate theoretical "pristine" rangeland conditions that may have existed before livestock grazing began. It is assumed that most areas will be grazed unless there is no way to graze them and still achieve standards or the area is dedicated to other uses such as campgrounds, mining, and cultural or historical sites, like Pompey's Pillar.

At a minimum, State or regional standards must address:

- watershed function;
- nutrient cycling and energy flow;
- water quality;
- habitat for endangered, threatened, proposed, Candidate 1 or 2 or special status species; and
- habitat quality for native plant and animal populations and communities.

Guidelines for grazing management are the types of grazing management methods and practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting standards.

Guidelines are best management practices (BMP), treatments, and techniques and implementation of range improvements that will help achieve rangeland health standards. Guidelines are flexible and are applied on site specific situations.

Field managers must determine if standards are being met, consider what factors are causing standards not to be met, and take appropriate action to deal with those factors. If livestock grazing is preventing achievement of standards, then guidelines would be applied through terms and conditions. If an area is not meeting standards due to conditions that are not related to livestock grazing then the grazing management may not need to be adjusted.

Guidelines may be adapted or changed when monitoring or other information indicates the guidelines are not effective or a better means of meeting applicable standards exist.

The new grazing regulations under 43 CFR 4180.2(e) require that minimum, state or regional guidelines developed must address a list of attributes:

- maintain or promote adequate amounts of vegetative ground cover;
- maintain or promote subsurface soil conditions;
- maintain, improve or restore riparian-wetland functions;
- maintain or promote stream channel morphology;
- maintain or promote appropriate kinds and amounts of soil organisms, plants and animals;
- promote the opportunity for seedling establishment;
- maintain, restore, enhance water quality;
- restore, maintain or enhance T&E habitat;
- restore, maintain, enhance T&E candidate and special
status species habitat;
- maintain or promote native populations and their communities;
- emphasize native species in the support of ecological function; and
- only incorporate the use non-native plant species when native species are not available or are incapable of achieving proper functioning condition.

Terms and conditions of permits and leases are specific actions in the permit or lease that implement the spirit and intent of the standards and guidelines.

Terms and conditions are site specific. They are determined by an interdisciplinary team in consultation with permittees and interested parties for each individual allotment. Terms and conditions are a tool to achieve resource conditions in the standard. They are meant to be modified if monitoring data shows those terms and conditions currently being applied are not achieving desired results.

Standards for Rangeland Health

Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant progress towards these functions and conditions is required of all uses of public rangelands. Historical data, when available, should be utilized when assessing standards.

Miles City STANDARD #1:

Uplands are in proper functioning condition.

This means that soils are stable and provide for the capture, storage and safe release of water appropriate to soil type, climate and landform. The amount and distribution of ground cover (i.e., litter, live and standing dead vegetation, microbiotic crusts, and rocks/gravel) for identified ecological site(s) or soil plant associations is appropriate for soil stability. Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/surface sealing and compaction layers below the soil surface is minimal. Ecological processes including hydrologic cycle, nutrient cycle and energy flow are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential and there is a diversity of species characteristic of and appropriate to the site.

• As indicated by:

Physical Environment

- erosional flow patterns;
- surface litter;
- soil movement by water and wind;
- infiltration;
- soil crusting and surface sealing;
- compaction layer;
- rills;
- gullies;
- cover amount; and
- cover distribution.

Biotic Environment

- community diversity;
- community structure;
- exotic plants;
- photosynthesis activity;
- plant status;
- seed production;
- recruitment; and
- nutrient cycle.

Miles City STANDARD #2:

Riparian areas and wetlands are in proper functioning condition.

This means that the functioning condition of riparian-wetland areas is a result of the interaction among geology, soil, water, and vegetation. Riparian-wetland areas are functioning properly when adequate vegetation, landform,

or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid flood plain development; improve flood water retention and ground water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity.

The riparian/wetland vegetation is controlling erosion, stabilizing streambanks, shading water to reduce stream temperature in the summer and provide thermal protection in the winter, stabilizing shorelines, filtering sediment, aiding flood plain development, dissipating energy, delaying floodwater, and increasing recharge of ground water where appropriate to landform. The stream channels and flood plain dissipate the energy of high water flows and transport sediment appropriate for the geomorphology (e.g., gradient, size, shape, roughness, confinement, and sinuosity), climate, and landform. Soils support appropriate riparian-wetland vegetation, allowing water movement, filtering sediment, and storing water for later release. Stream channels are not entrenching and water levels maintain appropriate riparian/wetland species.

Riparian Areas are defined as an area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and streambanks are typical riparian areas. Excluded are such sites a ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

• Proper functioning condition of riparian areas are Indicated by:

Hydrologic

- flood plain inundated in relatively frequent events;
- amount of altered streambanks;
- sinuosity, width/depth ratio, and gradient are in-balance with the landscape setting (i.e., landform, geology, and bioclimatic region);
- riparian zone width; and
- upland watershed not contributing to riparian degradation.

Erosion Deposition

- flood plain and channel characteristics, i.e., rocks, coarse and/or woody debris adequate to dissipate energy;
- point bars are vegetating;
- lateral stream movement is associated with natural sinuosity;
- system is vertically stable;
- stream is in-balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition); and
- bare ground.

Vegetation

- reproduction and diverse age structure of vegetation;
- diverse composition of vegetation;
- species present indicate maintenance of riparian soil moisture characteristics;
- streambank vegetation is comprised of those plants or plant communities that have deep binding root masses capable of withstanding high streamflow events;
- utilization of trees and shrubs;
- healthy riparian plants; and
- adequate vegetative cover present to protect banks and dissipate energy during high flows.

Miles City STANDARD #3:

Water quality meets Montana State standards.

This means that surface and ground water on public lands fully support designated beneficial uses described in the Montana Water Quality Standards.

• As indicated by:

- dissolved oxygen concentration;
- pH;
- turbidity;
- temperature;
- fecal coliform;
- sediment;
- color;
- toxins; and
- others: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

Miles City STANDARD #4:

Air quality meets Montana State standards.

This means that air quality on public lands helps meet the goals set out in the State of Montana Air Quality Control

Implementation Plan. Efforts will be made to limit unnecessary emissions from existing and new point or non-point sources.

Bureau of Land Management management actions or use authorizations do not contribute to air pollution that violates the quantitative or narrative Montana Air Quality Standards or contributes to deterioration of air quality in selected class areas.

• As indicated by:

Section 176(c) Clean Air Act which states that activities of all Federal agencies must conform to the intent of the appropriate State Air Quality Implementation Plan and not:

- cause or contribute to any violations of ambient air quality standards;
- increase the frequency of any existing violations; and
- impede the State's progress in meeting their air quality goals.

Miles City STANDARD #5:

Habitats are provided for healthy, productive, and diverse native plant and animal populations and communities. Habitats are improved or maintained for special status species (federally threatened, endangered, candidate or Montana species of special concern).

This means that native plant communities will be maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant lifeforms. Where native communities exist, the conversion to exotic communities after disturbance will be minimized. Management for native vegetation is a management priority. Ecological processes including hydrologic cycle and energy flow are maintained and support healthy biotic populations. Plants are vigorous, biomass production is near potential and there is a diversity of species characteristic of and appropriate to the site. The environment contains all the necessary components to support viable populations of a sensitive/threatened and endangered species in a given area relative to site potential. Viable populations are wildlife or plant populations that contain an adequate number of reproductive individuals distributed on the landscape to ensure the long-term existence of the species.

• As indicated by:

- plants and animals are diverse, vigorous and reproducing satisfactorily, noxious weeds are absent or insignificant in the overall plant community;
- an effective weed management program is in place;
- spatial distribution of species is suitable to ensure reproductive capability and recovery;
- a variety of age classes are present (at least two age classes);
- connectivity of habitat or presence of corridors prevents habitat fragmentation
- diversity of species (including plants, animals, insects and microbes) are represented; and
- plant communities in a variety of successional stages are represented across the landscape. This will be accomplished by allowing progression of succession in conjunction with livestock grazing.

Guidelines

Guidelines for grazing management are preferred or advisable approaches to grazing management practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard(s).

Guidelines are provided to maintain or improve resource conditions in upland and riparian habitats available to livestock grazing. In both riparian and upland habitats, these guidelines focus on establishing proper functioning conditions. The application of these guidelines is dependent on individual management objectives. Desired future conditions in plant communities and streambank characteristics will be determined on a case-by-case basis.

Miles City GUIDELINE #1:

Grazing will be managed in a manner that will maintain the proper balance between soils, water, and vegetation over time. This balance varies with location and management objectives, but acceptable levels of use can be developed that are compatible with resource objectives.

Miles City GUIDELINE #2:

Manage grazing to maintain watershed vegetation, biodiversity, and flood plain function. Maintain riparian vegetative cover and structure to trap and hold sediments during run-off events to rebuild streambanks, restore/recharge aquifers, and dissipate flood energy. Promote deep-rooted herbaceous vegetation to enhance streambank stability. Where potential for woody shrub species (willows, dogwood, etc.) exists, promote their growth and expansion to aid in controlling animal access to streambanks, and to provide wildlife cover.

Miles City GUIDELINE #3:

Pastures and allotments will be identified based on their sensitivity and suitability for livestock grazing. Unsuitable

or potentially unsuitable areas may be fenced into separate management areas, or managed more intensively.

Miles City GUIDELINE #4:

Based on long-term monitoring, management strategies for livestock grazing will ensure that long-term resource capabilities can be sustained over time. Natural and management induced streambank alteration, end of season stubble heights, and utilization of herbaceous and woody vegetation are critical factors which must be evaluated in any grazing strategy. These considerations are essential to achieving long-term vegetation or stream channel objectives. Where appropriate, acceptable levels of streambank alteration and herbaceous/woody utilization should be identified on a site-specific basis, and used as terms and conditions. Compatible seasons and duration of use, rest periods, stocking rates, structural facilities, and management activities can then be designed to ensure that standards are achieved.

Miles City GUIDELINE #5:

Frequency of grazing and extent of defoliations will be managed to promote desired plants and plant communities, based on the rate and physiological conditions of plant growth. To meet these plant growth considerations, the following could be applied: No grazing unit should be grazed for more than half the growing season of key plant species. Periods of use throughout the growing season (early, mid, late) should be alternated from year to year. Defer each field from grazing until seeds set at least once every 3 years. The season of use should be alternated from year to year to allow for regeneration of woody and herbaceous species. Stages of plant growth, length of grazing period, target utilization levels, and frequency of grazing should be used to determine when livestock are ready to be moved to another grazing unit, instead of calendar dates. Caution should be used with early spring grazing use when soils and streambanks are wet and susceptible to compaction and physical damage that occurs with animal trampling. Likewise, late summer and fall treatments in woody shrub communities can result in excessive utilization.

Miles City GUIDELINE #6:

Monitoring is essential to determine if management guidelines and terms and conditions are meeting standards or making significant progress towards achieving standards. Monitoring data over time shall be used to make adjustments to grazing management as needed. In monitoring standards, Bureau of Land Management will consider the impacts of all multiple uses on public rangelands.

Miles City GUIDELINE #7:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

Miles City GUIDELINE #8:

Locate new facilities (e.g., corrals, water developments) away from riparian-wetland areas.

Miles City GUIDELINE #9:

When provided, supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas. Generally, salt and minerals should be placed in upland sites to draw livestock away from watering areas or other sensitive areas and to contribute to more uniform grazing distribution.

Miles City GUIDELINE #10:

For guidelines for noxious weed management refer to "Guidelines for Coordinated Management of Noxious Weeds in the Greater Yellowstone Area." These guidelines provide a unified effort in developing a public awareness program; a prevention program; and a common inventory, mapping, monitoring, and reporting procedure. An overall management plan and specific action plans can be developed for logical units of land called weed management areas.

Miles City GUIDELINE #11:

Grazing management practices should maintain or promote the interaction of the hydrologic cycle, nutrient cycle and energy flow that will support the appropriate types and amounts of soil organisms, plants, and animals appropriate to soil type, climate and landform.

Miles City GUIDELINE #12:

Livestock management should utilize management practices for livestock grazing that meet or exceed those best management practices approved by the State of Montana in order to maintain, restore or enhance water quality.

Miles City GUIDELINE #13:

Grazing management practices should maintain or improve habitat for federally listed threatened, endangered, and special status plants and animals.

Miles City GUIDELINE #14:

Grazing management practices should maintain or promote physical, ecological and biological functions and conditions to sustain native plant and animal communities.

STANDARDS FOR RANGELAND HEALTH
AND
GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

THE DAKOTAS

Standards

Dakotas STANDARD #1:

Uplands are in proper functioning condition for site specific conditions of climate, soils and parent material.

• As indicated by:

Physical Environment

- erosional flow patterns;
- surface litter;
- soil movement by wind and water;
- infiltration;
- soil crusting and surface sealing;
- rills;
- gullies;
- cover amount; and
- cover distribution.

Biotic Environment

- community diversity;
- community structure;
- exotic plants;
- photosynthesis activity;
- plant status;
- seed production;
- recruitment; and
- nutrient cycle.

• Background Information

No single factor or characteristic of an upland site can provide a complete picture of either that site's condition or the direction of its successional change. Things considered "negative" in traditional evaluations of ecological sites may or may not be such for upland sites.

Rangeland health should be based on the evaluation of several criteria including, at a minimum, degree of soil stability and watershed function, nutrient cycles and energy flows, and available recovery mechanisms.

Indicators to assess soil stability and watershed function relate to two fundamental processes of watershed degradation: soil erosion by wind and water; and infiltration of precipitation and runoff.

Indicators such as rills, gullies, flow patterns, pedestaling and compaction may be used to assess watershed condition.

Indicators that can be used to evaluate nutrient cycles and energy flows relate to distribution of plants, litter, roots, and photosynthetic period.

Recovery mechanisms or plant demographic indicators may include increasing vegetative cover, plant vigor, kind and number of seedlings, and changes in plant age distribution.

Physical features of a proper functioning watershed are indicated by:

- little evidence of soil erosion by wind and/or water as indicated by the significant absence of rills, gullies, and pedestals;
- surface sealing and soil crusting is not evident; and
- plant (ground) cover and litter accumulation is adequate to protect site.

Soils are stable and provide for capture, storage, and release of water appropriate to soil type, climate and landform.

Biotic features of a proper functioning watershed are indicated by:

- a sufficient variety and number of plant lifeforms (grass, forb, shrub, tree) occur on the site;
- plants exhibit optimal size, height, distribution, and age/class;
- introduced or exotic plants (weeds) are absent or sparse on site;
- plants are alive, productive with well developed root systems;
- plant reproduction is adequate for stand maintenance of all lifeforms;
- litter distribution is uniform across site; and
- nutrient/energy cycle mechanisms are adequate for plant maintenance.

Dakotas STANDARD #2:

Riparian areas and wetlands are in proper functioning condition for site specific conditions of climate, soils and parent material.

• As indicated by the presence or absence of:

Hydrologic

- flood plain inundated in relatively frequent events;
- altered streambanks;
- upland watershed not contributing to riparian degradation; and
- stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and landform.

Erosion Deposition

- flood plain and channel characteristics; i.e., rocks, coarse and/or woody debris adequate to dissipate energy;
- lateral stream movement is associated with natural sinuosity;
- system is vertically stable;
- stream is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition); and
- bare ground.

Vegetation

- healthy, productive and diverse populations of native species are being maintained;
- condition of trees and shrubs;
- riparian plants exhibit high vigor; and
- adequate vegetative cover present to protect banks and dissipate energy during high flows.

• Background Information

No single factor or characteristic of a riparian site can provide a complete picture of either that site's condition or the direction of its successional change. Things considered negative in traditional evaluations of ecological sites may not be such for riparian sites. For example, the percent of exposed soil surface, which often reflects overgrazing or erosion on upland sites, may be a result of normal riparian activity, sediment deposition resulting after spring runoff, or a high water event.

Broadly, proper functioning condition may be defined as the ability of a stream to perform its riparian functions. These functions include sediment filtering, bank building, water storage, aquifer recharge, and hydrologic energy dissipation.

• Hydrology\Streambanks

The hydrology of a riparian area is perhaps its most important characteristic. Changes in hydrology may result in short- and long-term vegetative changes. In some situations, construction (riprap, roads, railroads, etc.) has influenced the streambanks and stability has been increased over the natural levels. These streambanks may eventually lose their stability, and become altered. This generally occurs if the problems which caused the weak streambanks have not been remedied. Also, constructed streambanks (especially those with riprap) will often disrupt the normal energy dissipation of the stream and eventually the meandering of a stream can result in the erosion of streambanks downstream.

- Lateral Cutting is indicated by new stream-caused bank disruption along the outside of stream curves, and much less common, along the straight portions of a stream. A high degree of active lateral cutting can indicate a degraded watershed.

- Altered Streambanks, in many instances, land uses have degraded streambanks, accelerating stream movement across the flood plain. We define altered streambanks as those having impaired structural integrity (strength or stability) due to activities which expose soil surfaces as a result from hiking, ATV, livestock and wildlife trails, roads, logging skid trails, mining activities, etc.

- Deep Binding Root Mass, properly functioning streambanks are protected by both vegetation and bank rock materials (e.g., boulders and cobbles). There have been few studies documenting the depth and extent of root systems of various plant species. Among riparian herbaceous species, the first rule is that annual plants do not have deep, binding root masses. Perennial species, including trees and shrubs, offer a wide range of root mass qualities and may indicate long term streambank stability.

- Downcutting, active downcutting of a stream is often hard to recognize. Perched wetland vegetation and streambank features, plus the lack of a separate layer of channel bottom materials (i.e., the stream flows directly on the substrate materials), can be clues to downcutting.

• Soils/Geology

The soils and geology (landform and parent material) of a riparian site influence how the site reacts to disturbances

and changes over time. Changes in physical characteristics are often more difficult to remedy through management actions than are vegetative changes. The depth and texture of soil of a riparian site influences the capacity of that site to hold water and act as a sponge for prolonged late season flows and support of desired vegetation.

- Bare ground, exposed soil surface is important in evaluating the health of riparian areas for several reasons: 1) vulnerability to erosion; 2) it may contribute to, as well as reflect, streambank deterioration; 3) less vegetation is available for soil protection and sediment entrapment; and 4) exposed soil provides opportunity for introduction of native plant species as well as invasion by noxious weeds and undesirable species.

• Vegetation

Because they are more visible than soil or hydrological characteristics, plants may provide early indications of riparian health.

- Reproduction of Trees and Shrubs, one of the clearest indicators of ecological stability, and subsequent health, is the presence of all age classes (seedling, sapling, pole, mature, decadent, and dead) of tree and shrub species where the potential exists.

- Dead and Decadent Trees and Shrubs, the amount of dead and decadent material in trees and shrubs can be an indicator of the overall "health" of riparian areas. Decadent and dead woody material can indicate severe stress from artificial or natural causes and may be caused by severe winter temperatures, spring freezes, disease, over utilization, or insect infestations.

- Utilization of Trees and Shrubs, heavy utilization by livestock and/or wildlife can prevent the regeneration or establishment of woody species. Excessive use of woody species may cause their elimination from the site and their replacement by disturbance-induced species or undesirable invaders.

- Plant Composition, the presence of disturbance-induced herbaceous plants (either native or introduced) may indicate that the health of the site could be improved or that it is not performing optimal riparian functions. Most of these species provide less soil holding and sediment trapping capability, and less desirable forage for livestock and wildlife.

Dakotas STANDARD #3:

Water quality meets assigned State water quality standards.

• As indicated by:

- dissolved oxygen concentration;
- pH;
- turbidity;
- temperature;
- fecal coliform;
- sediment;
- color;
- toxins; and
- others: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

• Background Information

Natural processes influence the chemical, physical, and biological characteristics of water. When discussing rangeland health, water quality is a relative term which must be associated with water-use to become meaningful. Water quality varies from place to place, with the seasons, the climate, and the kind of rock and soil through which water moves. After reaching the earth, water dissolves minerals from the earth's crust, percolates though organic materials such as roots and leaves, and reacts with living things such as microscopic organisms like plankton and algae. Water quality is changed by stream sediments and is modified by temperature, soil bacteria, and evaporation.

Water quality criteria specify concentrations of water constituents which, if not exceeded, are expected to support an aquatic ecosystem suitable for higher uses of water. Water quality criteria are intended to protect the direct uses of water, essential and significant life in water, and life that is dependent on life in water for its existence.

Some of the common indicators of water quality are:

- Dissolved oxygen concentration (DO), which is a function of temperature of the water, altitude and barometric pressure. The ability of water to hold oxygen decreases with the increases in temperature, altitude and dissolved solids.

- pH (hydrogen-ion concentration), which is an indicator of acidity and/or alkalinity and an index of hydrogen ion activity. Lower values indicate acid; higher values indicate alkaline. Fresh water organisms function properly if the pH ranges from 6.0 to 9.0 units. pH concentrations below the recommended level are toxic to fish and other aquatic organisms.

- Turbidity, which is the disturbance of water due to the presence of suspended matter such as clays, silt, organic matter, and various effluents. It is the expression of the optical property of water. Excess turbidity reduces light penetration.

- Temperature, which is an important function which affects aquatic productivity. Temperature changes may result from natural climatic conditions or man's manipulation of the riparian environment. Temperature is a function of location, season, time, duration of flow, depth, and many other variables, which may or may not be affected by human activities.

- Coliform groups, which include bacteria organisms in their natural habitat and sources; i.e., feces, soil, water, vegetation, etc. Coliform organisms may be the result of plant and soil runoff water.

- Sediment, which is a measure of suspended sand, silt, colloid and organic matter which will settle in time to the stream bottom. Sediment originates from sources such as natural erosion, mine waste, plowed fields, construction projects, or vegetative manipulation.

- Color, which is attributed to substances in solution after the suspensoid have been removed. It may be organic or inorganic substances that affect photosynthesis activity in the water. Organic substances include humic materials, peat, aquatic plants, etc. Inorganic sources include iron and manganese compounds, chemicals, industrial waste, etc.

- Toxins, which are those compounds or substances which are found in by-products or waste of various industries or activities that make their way into water sources.

Acceptable water quality is indicated by:

- dissolved oxygen (DO) concentrations which are being maintained at or near saturation levels;

- pH concentrations which are at or near recommended State levels;

- turbidity readings which do not exceed Jackson Turbidity readings for the water source;

- water temperature readings which meet State standards preferred for good growth and productivity;

- coliform levels which do not exceed the State average for the site;

- sediment (suspended solids) which does not exceed the State standard;

- color which does not limit or significantly restrict photosynthesis processes; and

- toxin levels which are in conformance with State standard.

Dakotas STANDARD #4:

Air quality meets State air quality standards.

(Note: The Montana and the Dakotas standards are similar)

PM-10	50 ug/m3 annual avg 150 ug/m3 24-hr avg*
Sulfur Dioxide	0.02 ppm annual avg 0.10 ppm 24-hr avg* 0.50 ppm 1-hr avg**
Carbon Monoxide	23 ppm hourly avg* 9.0 ppm 8-hr avg*
Nitrogen Dioxide	0.05 ppm annual avg 0.30 ppm hourly avg*
Ozone	0.10 ppm hourly avg*
Lead	1.5 ug/m3 90 day avg
Foliar Fluoride	35 ug/g grazing season avg 50 ug/g monthly avg
Settled Particulate Matter (dustfall)	10mg/m2 30-day avg
Hydrogen Sulfide	0.05 ppm hourly avg*
Visibility	particle scattering coefficient of 3X10-5 per meter annual avg***

* Not to be exceeded more than once per year.
** Not to be exceeded more than 18 times per year.
*** Applies to PSD mandatory Class I areas.

The Clean Air Act established the Prevention of Significant Deterioration (PSD) regulations which set limits for increases in ambient pollution levels and established a system for preconstruction review of new major air pollution sources. Three PSD classes have been established: Class I, Class II, and Class III. Class I areas consist of all international parks, national parks greater than 5,000 acres,

national wilderness areas greater than 5,000 acres, and national wildlife refuges which existed on August 7, 1977, when the amendment was signed into law.

Protection of air quality is provided to Class I areas by severely limiting the amount of additional human-caused air pollution which can be added. All other areas, except non-attainment areas, are classified as Class II in which a greater amount of additional human-caused pollution may be added. In no case, however, may pollutant concentrations exceed the National or State ambient air quality standards.

Dakotas STANDARD #5:

Habitats are maintained and/or restored, where appropriate, for healthy, productive and diverse populations of native plant and animal species.

• As indicated by:

- plants and animals are diverse, vigorous and reproducing satisfactorily noxious weeds are absent or insignificant in the overall plant community;

- spatial distribution of species is suitable to ensure reproductive capability these species may include special status species (federally threatened, endangered, candidate or Montana/North Dakota/South Dakota species of special concern);

- species diversity (including plants, animals, insects and microbes) is present;

- livestock grazing systems are designed to maintain rangeland health and to ensure a variety of plant communities are present; and

- connectivity of habitat or presence of corridors to prevent habitat fragmentation.

• Background Information

No single factor or characteristic of a site can provide a complete picture of either that site's condition or the direction of its successional change.

Bureau of Land Management is charged with managing and developing habitat for a large variety of fish, wildlife and special status species of plants. Basic habitat considerations can be categorized as including food, water, cover, and space. Specific habitat requirements often vary depending on what geographic area is being considered, species which are present, and the nature and extent of other uses which may be competing. A review of components of the above listed standards (Proper Functioning Riparian-Wetland areas, Uplands and Water Quality) will provide many of the requirements needed to achieve fish, wildlife, and special status plant habitat.

Guidelines

Guidelines for grazing management are preferred or advisable approaches to grazing management practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard(s).

Guidelines are provided to maintain or improve resource conditions in upland and riparian habitats available for livestock grazing. In both riparian and upland habitats, these guidelines focus on establishment and maintenance of proper functioning conditions. The application of these guidelines is dependent on individual management objectives. Desired future conditions in plant communities and streambank characteristics will be determined on a site specific basis.

Dakotas GUIDELINE #1:

Grazing will be managed in a manner that will maintain the proper balance between soils, water, and vegetation over time. This balance varies with location and management objectives, but acceptable levels of use can be developed that are compatible with resource objectives.

Dakotas GUIDELINE #2:

Manage grazing to maintain or improve watershed vegetation, biodiversity, and flood plain function. Maintain or improve riparian vegetative cover and structure to trap and hold sediments during runoff events to rebuild streambanks, restore/recharge aquifers, and dissipate flood energy. Utilize management practices that promote deep-rooted herbaceous vegetation to enhance streambank stability, and the growth and expansion of woody species to provide wildlife habitat.

Dakotas GUIDELINE #3:

Pastures and allotments will be evaluated for sensitivity and suitability for livestock grazing. Unsuitability or potentially unsuitable areas may be excluded from grazing, and/or managed more intensively.

Dakotas GUIDELINE #4:

Management strategies for livestock grazing will ensure that long-term resource capabilities can be sustained. Natural and management-induced streambank alteration, and utilization of herbaceous and woody vegetation are critical factors which must be evaluated in any grazing management plan. Acceptable levels of streambank alteration and

herbaceous/woody utilization shall be identified on a site specific basis, and used in terms and conditions. Compatible seasons and duration of use, rest periods, stocking rates, structural facilities, and management activities can then be designed to ensure that standards are achieved.

Dakotas GUIDELINE #5:

Frequency of grazing and extent of defoliations will be managed to promote desired plants and plant communities, based on the rate and physiological conditions of plant growth. To meet these plant growth considerations, the following may be applied: no grazing unit should be grazed for more than half the growing season of key plant species; periods of use throughout the growing season (early, mid, late) should be alternated from year to year; and pastures should be deferred from grazing at least once every 3 years or until seeds set. The season of use should be alternated from year to year to allow for regeneration of woody and herbaceous species. Rather than using calendar dates, stages of plant growth, length of grazing period, and target utilization levels should be used to determine when livestock should be moved to another grazing unit. Caution should be used to avoid early spring grazing use when soils and streambanks are wet and susceptible to compaction and physical damage that occurs with animal trampling.

Dakotas GUIDELINE #6:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

Dakotas GUIDELINE #7:

Locate permanent facilities (e.g., corrals, water developments) away from riparian-wetland areas.

Dakotas GUIDELINE #8:

Supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas. These should be placed in upland sites to draw livestock away from watering areas, or other sensitive areas, and to contribute to more uniform grazing distribution.

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Dakotas GUIDELINE #9:

For the guidelines of noxious weed management refer to "Guidelines for Coordinated Management of Noxious Weeds in the Greater Yellowstone Area." These guidelines provide a unified effort in developing a public awareness program; a prevention program; and a common inventory, mapping, monitoring, and reporting procedure. An overall management plan and specific action plans can be developed for logical units of land called weed management areas. Guidelines for noxious weed control management must meet or exceed State laws.

Dakotas GUIDELINE #10:

Grazing management practices should maintain or promote the interaction of the hydrologic cycle, nutrient cycle and energy flow that will support the appropriate types and amounts of soil organisms, plants, and animals appropriate to soil type, climate and landform.

Dakotas GUIDELINE #11:

Livestock grazing practices should be utilized to protect water quality or restore water quality to water bodies not fully supporting designated beneficial uses (e.g., water quality limited streams). Bureau of Land Management management actions or use authorizations do not contribute to pollution that violates the quantitative or narrative North or South Dakota Quality Standards.

Dakotas GUIDELINE #12:

Grazing management practices should maintain, improve or restore habitat to assist in the recovery or promote conservation of federally listed threatened, endangered, and sensitive plant and animals.

Dakotas GUIDELINE #13:

Grazing management practices should maintain or promote the physical and biological conditions to sustain native populations and communities, and should emphasize native species in support of ecological functions.

Dakotas GUIDELINE #14:

Non-native plant species are used only in those situations in which native species are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

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